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RECLAMATION

March 28, 1979

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Enclosed is the draft environmental impact statement (DEIS) on the proposed plans of mining and reclamation for Kaiser Cement and Gypsum Corporation's open pit limestone mine, Montana City, Montana. This DEIS was prepared by the State of Montana, Department of State Lands.

This document was prepared in compliance with the National Environmental Policy Act (NEPA) and Montana Environmental Policy Act (MEPA). On March 28, 1979, copies of the DEIS were filed with the Governor of Montana, and the Montana Environmental Quality Council.

A 30-day comment period has been established to allow interested persons to review the enclosed DEIS and submit comments to the Montana Department of State Lands. Comments should be addressed to the following individual:

Ralph Driear
Environmental Administrator
Department of State Lands
Capitol Station
Helena, MT 59601

Comments should be postmarked no later than midnight, April 27, 1979, for consideration in the final environmental impact statement. A 15-day extension can be requested by a commentator. Following the end of the comment period, comments will be included in the final environmental impact statement along with responses prepared by the Montana Department of State Lands.

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MONTANA DEPARTMENT OF STATE LANDS

DRAFT

ENVIRONMENTAL IMPACT STATEMENT

PROPOSED PLAN OF MINING AND RECLAMATION

KAISER CEMENT

AND

GYPSUM CORPORATION

JEFFERSON COUNTY

Prepared by

Montana department of State Lands

Commissioner
Montana Department of State Lands

Ralph Driear
Environmental Administrator
Montana Department of State Lands

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INTRODUCTION

Preface

This statement was prepared by the Montana Department of State Lands and represents an analysis of broad cumulative environmental impacts of a proposal by Kaiser Cement and Gypsum Corporation to permit 700 acres for a limestone open-pit mine and related disturbance near Montana City, Jefferson County, Montana.

In November, 1978, the Kaiser Cement and Gypsum Corporation submitted a hard rock operating permit application for development of a limestone ore body near Montana City, Jefferson County, Montana. Additionally, KC&GC submitted to the Department for review, baseline environmental data for the proposed permit area compiled by the Diehl Corporation as part of a larger land use capability study in the area, and by Fredrick Munday, Department of Anthropology, University of Montana.

The Montana Environmental Policy Act (MEPA) requires that Environmental Impact Statements (EIS) be prepared on proposals for projects, programs, legislation, and other major actions of state government significantly affecting the quality of the human environment (Section 69-6504, R.C.M. 1947). Pursuant to MEPA, and at the request of KC&GC, the Department prepared a draft Environmental Impact Statement on the proposed action.

Agency Responsibilities and Interagency Relationships

Responsibilities of Montana State Agencies

Department of State Lands

The Montana Board of Land Commissioners[1] (Board) and Montana Department of State Lands[2] (Department) are responsible for the administration of the MONTANA HARD ROCK LAW (Title 82, Chapter 4, Part 2, MCA). Pursuant to its duties as administering agency for the HARD ROCK LAW, the Department must review and then grant or deny a hard rock mine permit or permit amendment within a period negotiable with the applicant to be not less than 60 days, nor more than 425 days after the submission of a complete permit application. The Department reviews applications for conformance with provisions of the Hard Rock Law regarding the method of operation, water control, air quality, mine waste disposal, topsoiling and for the reclamation of lands affected by the proposed mining operations. The Board may adopt rules to accomplish the purpose of the Hard Rock Law, and the Department may adopt rules with respect to the filing of reports and the issuance of permits. To insure compliance with the Hard Rock Law and rules adopted pursuant to the Law, the Department is required to make mine inspections and investigations as necessary.

The Department may not approve hard rock mining in areas which meet the criteria for selective denial provisions as specified in Section 82-4-351 of the Hard Rock Law. The Department may conduct studies or encourage others to conduct studies of hard rock mining and hard rock mining land reclamation.

When the operator is not in compliance with requirements of the Hard Rock Law, rules pursuant to the law, or orders of the Department and has not achieved compliance within time limits set by the Department, the commissioner shall serve a notice of noncompliance on the operator or if necessary, he shall order the suspension of the permit. After a hearing, the Board shall order the Department to revoke the permit if requirements specified in the notice of noncompliance, in the order of suspension, or if an order of the Board requiring remedial measures have not been satisfied.

---

[1] The Board of Land Commissioners consists of the Governor, Attorney General, Superintendent of Public Instruction, State Auditor and Secretary of State.

[2] The Commissioner of State Lands is the chief administrative officer for the Department of State Lands and is appointed by and serves at the pleasure of the Governor.

Montana Department of Health and Environmental Services

The Air Quality Bureau of the Department of Health and Environmental Sciences has primary responsibility for air pollution control activities in the state of Montana. These responsibilities include the review of new sources of air pollution to be located in the state, enforcing standards and ensuring that Federal standards are achieved and maintained.

The Montana Clean Air Act (Title 75, Chapter 2, MCA) provides rule making authority to the Board of Health in regard to permits (Section 75-2-211). This rule making authority was exercised by the adoption of rule MAC 16-2.14(1)-S1400, Permits, Construction and Operation of Equipment. This rule provides that, prior to the construction or operation of any new or modified equipment of certain categories, a permit be obtained from the Department of Health, Air Quality Bureau.

In addition to the permit required, various facilities of development will be subject to certain emission standards as contained in the Administrative Records of Montana. The primary regulated source would be the crusher and the emissions of most concern that of particulate matter.

The Air Quality Bureau is also charged with achieving and maintaining both the state and federal ambient air quality standards. The Montana State Implementation Plan describes the state's efforts in achieving and maintaining federal ambient air quality standards. One requirement of this plan is that it provide for the achievement and maintenance of federal primary ambient air quality standards as soon thereafter as is practicable. In many areas of the state, and of the nation, the strategies to achieve the standard have not accomplished their desired result, i.e., achievement of the standard, but such achievement remains a primary goal of the agency.

Relationships Among State Agencies

Two State Agencies, the Department of State Lands, and the Department of Health and Environmental Sciences, have decisions to make in regard to the Kaiser Cement and Gypsum Corporation proposal that require environmental review under the Montana Environmental Policy Act.

I. DESCRIPTION OF KAISER CEMENT AND GYSUM CORPORATION MINING PROPOSAL

A. Mining Proposal

1. Background

Kaiser Cement & Gypsum Corporation (KC&GC) is a manufacturer of Portland Cement and has been operating the Montana City Plant, near Helena, Montana since 1963. The Corporation is chartered in the state of California and maintains as its principal address, 300 Lakeside Drive, Oakland, California 94666. The Corporations activities in Montana are currently the production, distribution, and sale of Portland Cement. The plant site is located in Jefferson County, Montana - Sections 7, 12, 13 and 18, T9N, R2, and 3W, M.P.M., and is approximately seven miles south of Helena, about one mile east of Interstate Highway 15, in an area known as Montana City. Kaiser Cement & Gypsum Corporation presently has a total of 215 acres bonded under Montana Operating Permit #0003 Covering 75 acres, and Montana Operating Permit #00090 totalling 140 acres, issued by the Department of State Lands. Several components require that the permitted area be increased:

1. Exploratory drilling under Exploration License #00203 has proven additional reserves of limestone which can be economically obtained by surface mining.

2. The additional permitted area is necessary to supply limestone to the cement making process by supplementing the present quarry operations and to eventually supply all the rock needed for the Montana City Plant in order to meet future market demands.

3. KC&GC will require the added permitted area in order to carry out future expansion plans and maintain the current manpower.

Based upon these components Kaiser Cement & Gypsum Corporation has made application for an operating permit for a future quarrying site. A permit has been requested for an additional 700 acres providing a total permitted area for Kaiser Cement & Gypsum Corporation at the Montana City site of 915 acres.

The property described in the permit application is owned by Kaiser Cement & Gypsum Corporation, with the exception of 17 acres of BLM land on which KC&GC has staked unpatented mining claims.

KC&GC owns all the mineral rights on the proposed permit area excluding one-half interest of the E½ SW¼ and the SW¼ SE¼, S10, T9 NR3W, Jefferson County, Montana, which is owned as tenants in common by Louise K. Scott and Dorothy K. Howard of Portland, Oregon.

2. Location

The proposed permit area is located in Jefferson County, on the N½ of S15, S½ of S10, plus NE¼ of the SE¼ of S9, and Lot 12 of S9, T9N, R3W, along with approximately 17 acres of BLM land which is staked as unpatented mining claims registered as KC Placer Mining Claim recorded in Book S of Placers, pages 174 and 175, KC-1, KC-2 and KC-3 Quartz Lode Mining Claims recorded in Book 63, pages 709, 711, 712, 713 and 714, with the Jefferson County Clerk and Recorder, Boulder, Montana.

The site of the proposed mining area is approximately 7 miles south of Helena. Access to the property can be made from Exit 187 on Interstate 15 west on County Road 518 to the two lane gravel Clark Gulch/Jackson Creek Road. The area is approximately 2½ miles west of the Montana City Plant. (Figure I-1)

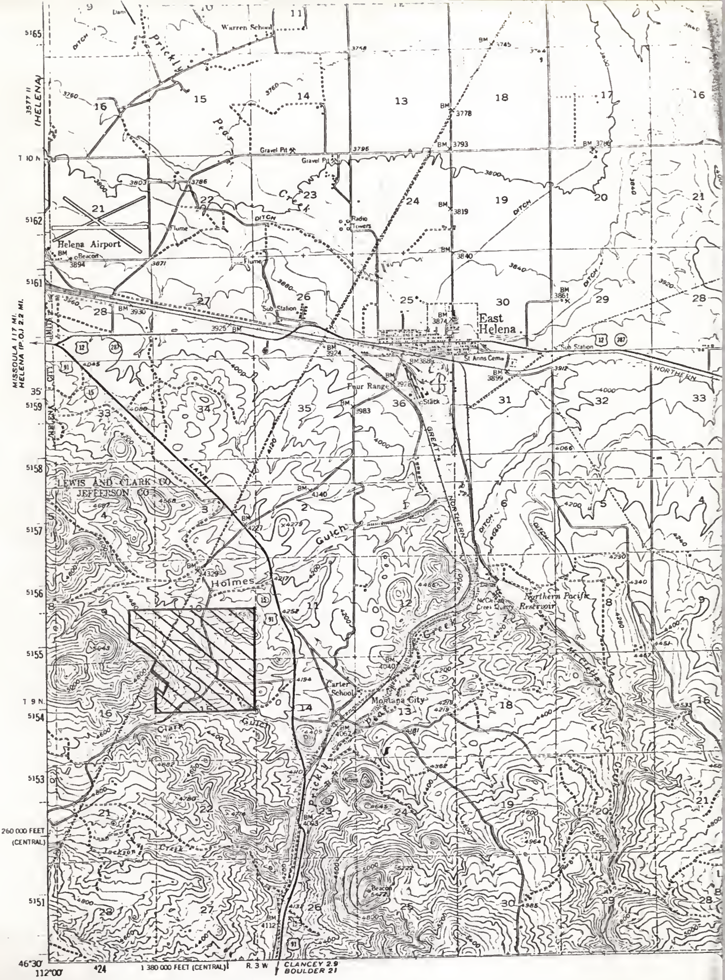
3. Mine Development

Mining will involve the extraction of large tonnages of low unit value limestone. Therefore, economic concerns dictate a high volume, low cost per ton mining method. Because the limestone occurs essentially at the surface with very little overburden, conventional open pit mining techniques will be employed. Procedurally, this will involve stripping and stockpiling usable topsoil for later reclamation, and establishing dump areas for waste rock. Mining levels will be established by drill-blast-load-haul techniques, employing drills, front-end loaders, haul trucks and time-delay blasting methods. Benches will be 25-30 feet in height and at least 3 benches will be under simultaneous development. This is because the rock must be blended from various locations in the pit due to composition differences. Initially, rock will be hauled down slope from higher elevations. As the upper benches are developed to their design limit, ramping down below the haul road level will mark the beginning of pit development.

First year mining is planned to begin on the small ridge immediately south of the North ¼ Corner Section 15. This will involve minimum stripping and the development of two benches.

4. Road Development

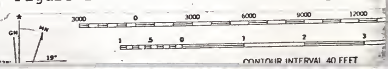
Construction of haul roads within the permit area will be necessary to provide access for the ore trucks to the county road located within the permit boundaries. The haul roads will be 40 to 60 feet in width and involve very little cut and fill activity. The roads will probably be surfaced with crushed limestone from the mining operation. Expansion of the mine pit as mining proceeds will require periodic relocation of these temporary haul roads. The existing county road through the proposed permit area may also need to be relocated at some time in the future to avoid interference with the mining operations. Until such time, a 100 foot buffer zone on either side of the county road will be left undisturbed.



(JEFFERSON CITY) 3576 I

Stereo compilation by Fairchild Aerial Surveys, Inc.
for the Bureau of Reclamation
Field examination and publication by the Geological Survey
as part of the Department of the Interior program
for the development of the Missouri River Basin
Control by USGS and USC&GS

Figure I-1. General Location Map.



5. Mining Equipment

Equipment that is proposed to be used in the mine permit area includes:

- 2 each - 7 Yard Loaders
- 1 each - Dozer Tractor
- 1 each - Water Truck
- 1 each - Blast Hole Drill
- 1 each - Dropball Crane
- 1 each - Road Patrol
- 1 each - Lube Truck
- 1 each - Maintenance Repair Vehicle
- 4 each - 25 Ton Bottom Dump Trucks

6. Fuel and Explosive Storage

Initially it is proposed that fuel and explosives used at the mine site be stored in existing facilities at the Montana City Plant. Transport of explosives to the mine site would be required to comply with the requirements of the Montana Mining Inspector, Montana Department of Labor. At a future point in mine development an explosives storage facility would probably be provided at the mine site.

7. Surface Drainage Control

Where operations result in a need to prevent acid drainage or sedimentation, on or in adjoining lands or streams, KC&GC will provide for the construction of earth dams or other reasonable devices to control water drainage, provided the formation of such impoundments or devices shall not interfere with other landowners rights or contribute to water pollution (as defined in the Montana Water Pollution Control Act as amended).

There are no streams or natural springs in the permit area. No impounding structures will be built.

If any tailings or spoil impounding structures become necessary in future years, they will be constructed with adequate spillways to protect against washout during a one hundred year flood.

Upon abandonment, water from the development or mining activities shall be diverted or treated in a manner designed to control siltation, erosion, or other waste pollution damage to streams or natural water courses.

Upon completion of operations a drainage diversion ditch or berm will be constructed around the perimeter of the pit, enabling surface water to be diverted around the pit and returned to natural drainage patterns, or where possible, diverted onto areas being reclaimed that would be designed to make use of this water without causing erosion problems. There will not be a feasible mode of keeping water drained out of the pit bottom that accumulates as a result of rainstorms and snow drifting into the pit area.

8. Dust Control Measures

All reasonable and proper precautions will be taken to assure that exposed cuts or spoil disposal areas will not be subject to wind erosion to the extent that air-borne detritus becomes a public nuisance or detriment to the flora and fauna of the area.

9. Topsoil Stockpile and Waste Dump

All debris associated with mining operations will be either overburden or dolomitic limestone. Figure I-2 shows general locations of the proposed waste dump and topsoil stockpile. Within this area it will be necessary to locate sites not underlain by limestone which will be suitable for waste dumps and soil stockpiles.

10. Employment Requirements

The proposed surface mining will operate on a 40 hour week, 8 hour shifts, and produce approximately 420,000 tons of usable stone each year.

The Montana City plant presently employs 87 people with a 10 person quarry crew. The proposed new quarry operation may require the addition of 3 or 4 employees.

Wages paid out in 1977 amounted to approximately $1,300,000.00.

11. Reclamation Plan

a. Mine and facilities

Figure I-2 shows general locations of the subject mineral and proposed waste dump area. The actual total area that will be disturbed is not finally delineated, as limestone reserves and future demands are currently open to speculation. Figure I-2 shows rather, the area containing the target minerals, and therefore, the maximum pit area.

Kaiser Cement & Gypsum Corporation will conserve for use in reclamation all soil materials that can be recovered from areas to be disturbed, where recovery of this material is practical and can be done without jeopardizing the safety of men and equipment. In reference to the SCS Soil Survey Map, the following stripping depths are anticipated:

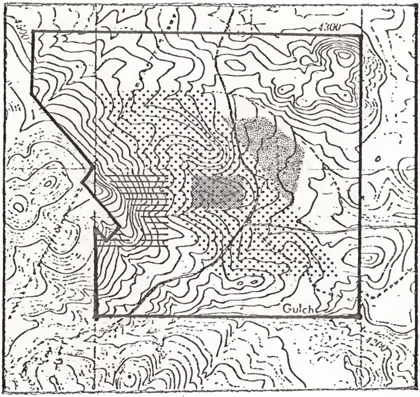


Figure I-2. Proposed Permit Area.

▒ Topsoil and Waste Dump Area

▓ Area to be Disturbed in the Next 12 Months

⠿ Target Minerals

☰ BLM Claims

a) 137 B Musselshell - Crago complex - 34 inches

b) 164 DE Windham - Lap channery loam - 6-14 inches or until 50% coarse fragments

c) 241 CE & 441 EP Pensore - Rock outcrop complex - 9 inches

d) 167 C Hilger Stony loam - 16 inches

e) 161 Nearada - Castner channery loam - 16 inches

In order to prevent wind and water erosion, Kaiser Cement & Gypsum Corporation will maintain the firmness of all stockpiled soil materials. As the mine advances, the stockpiles will annually have new topsoil placed over the vegetation and be reseeded.

When mining of economic limestone reserves has been completed, KC&GC plans to grade waste dump slopes into natural topography, with 2:1 slopes where possible, (Figure I-3) contour and revegetate them. Following grading of dump slopes, the disturbed areas will have a layer of topsoil, as available, placed on them and be reseeded with acceptable grasses. Contour benches will cut across reseeded slopes to prevent erosion damage and allow revegetation to be accomplished.

Disturbed areas other than waste dumps, and mine haul roads outside of the pit will be graded into the natural topography, be reseeded and have a layer of topsoil placed on them. Erosion will be controlled by contour trenches until revegetation can be established in these areas.

Under present long range plans, a long oval shaped void, measuring approximately 1,400 feet wide by 1,500 feet long by 250 feet deep will exist. No reclamation work is planned in the pit itself for several reasons.

1). Due to the steep slopes of the pit walls (.5 to 1), it will be unsafe to direct men and machines toward the reclamation.

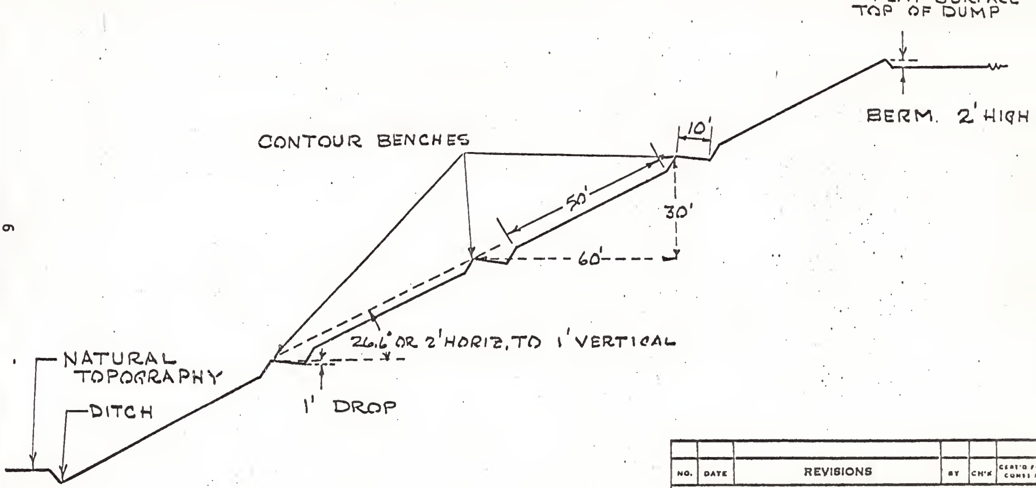
2). The solid rock walls will not support reclamation efforts.

3). Topsoil recovered will be far short of the amount necessary to undertake pit reclamation, and will be consumed in reclamation of waste dumps.

b. Revegetation

To the extent reasonable and within practical limits, KC&GC will return the maximum amount of disturbed land back to its use prior to mining being undertaken in the area, i.e., grazing of cattle.

KC&GC will establish vegetative cover as recommended by the Department of State Lands. Should the initial revegetation attempt fail, KC&GC will seek the



NO.	DATE	REVISIONS	BY	CH'K	CERT'D FO CONST

KAISER CEMENT & GYPSUM CORPORATION
PERMANENTE, CALIFORNIA

SCALE 1" = 30' | DATE 8·21-77 | JOB No.

CROSS SECTION OF PLAN FOR
RECLAIMING DUMP SLOPES

DRAWN L. RICE | CHECK
APPROVED | APPD. CONST.

Figure I-3.

advice of the Soil Conservation Service and the Department of State Lands be making a second attempt at establishing acceptable vegetation in the area.

The proposed initial seeding per acre is follows:

Bluebunch Wheatgrass *(Agropyron spicatum)*	
or Beardless Wheatgrass *(Agropyron inerme)*	8#
Thickspike Wheatgrass *(Agropyron dasystachyum)*	6#
Slender Wheatgrass *(Agropyron trachycaulum)*	6#
Green Needle Grass *(Stipa viridula)*	6#
Blue Grama *(Bouteloua gracilis)*	
or Sideoats grama *(Bouteloua curtipendula)*	2#
Sainfoin *(Onobryehis viciaefolia)*	2#
	30#

All abandoned areas will be graded and seeded as promptly as possible. The broadcast method will be used to establish revegetation in the disturbed areas.

At the time of actual revegetation, KC&GC will coordinate with the local soil conservation office and consult with the Department of State Lands to see if current recommendations are still best suited to the area.

c. Other considerations:

1). Where operations result in a need to prevent acid drainage or sedimentation, on or in, adjoining lands or streams, KC&GC will provide for the construction of earth dams or other reasonable devices to control water drainage, provided the formation of such impoundments or devices shall not interfere with other landowners rights or contribute to water pollution (as defined in the Montana Water Pollution Control Act as amended).

2). There are no streams or natural springs in the permit area. No impounding structures will be built.

If any tailings or spoil impounding structures become necessary in future years, they will be constructed with adequate spillways to protect against washout during a one hundred year flood.

3). KC&GC will comply with all applicable county, state, and federal laws regarding solid waste disposal. Refuse will be disposed of in a manner that will prevent water pollution or deleterious effects upon the revegetation efforts.

4). Upon abandonment, water from the development of mining activities

shall be diverted or treated in a manner disigned to control siltation, erosion, or other waste pollution damage to streams or natural water courses.

5). All access, haul and other roads will be located, constructed and maintained in such a manner (after giving practical consideration to the effectiveness of the operation) as to control and minimize channeling and other erosion.

6). All operations will be conducted so as to avoid range and forest fires and spontaneous combustion.

7). Archeological and historical values in areas to be disturbed shall be given appropriate consideration. The director of statewide archeological survey will be contacted as such discoveries are made. (Appendix A)

8). Provisions will be made as far as practical to avoid accumulation of stagnant water which may serve as a host or breeding area for mosquitoes or other disease bearing or noxious insect life.

9). Final grading will be done with non-noxious, non-flammable, non-combustible solids.

10). All reasonable and proper precautions will be taken to assure that exposed cuts and tailings or spoil disposal areas will not be subject to wind erosion to the extent that air-borne detritus becomes a public nuisance of detriment to the flora and fauna of the area.

11). All refuse will be disposed of in a manner that will prevent water pollution or deleterious effects upon the revegetation effort.

12). Upon completion of operations a drainage diversion ditch or berm will be constructed around the perimeter of the pit, enabling surface water to be diverted around the pit and returned to natural drainage patterns, or where possible, diverted onto areas being reclaimed that would be designed to make use of this water without causing erosion problems. There will not be a feasible mode of keeping water drained out of the pit bottom that accumulates as a result of rainstorms and snow drifting into the pit area. This accumulation is expected to be controlled by natural seepage into the ground through porous faults and fractures in the pit area.

13). After the pit has been abandoned, a fence will be placed around its perimeter to protect cattle and unauthorized persons from entering the area and warning signs will be posted on the fence.

14). No relocation of streams will be necessary.

15). Revegetation will be accomplished in the first appropriate season after final grading is complete.

16). Reclamation activities, particularly those relating to the control or erosion, will, to the extent feasible, be done in conjunction and simultaneously with the mining activities. KC&GC agrees in the absence of an order by the Board providing a longer period, the reclamation activities will be completed within two years after any area in the Proposed Reclamation Plan becomes abandoned.

17). In the absence of emergency or suddenly threatened or existing catastrophe, KC&GC will not depart from an approved plan without having previously obtained from the Department written approval of the proposed change.

12. Performance Bond

The Hard Rock Law (Title 82, Chapter 4, Part 3, MCA) states:

> *The applicant shall file with the department a bond payable to the state of Montana with surety satisfactory to the department in the penal sum to be determined by the department of not less than two hundred dollars ($200) nor more than twenty-five hundred dollars ($2,500) for each acre or fraction thereof of the disturbed area, conditions upon the faithful performance of the requirements of this act and the rules of the board. In lieu of such bond the applicant may file with the board a cash deposit, an assignment of a certificate of deposit, or other surety acceptable to the board. Regardless of the above limits, the bond shall not be less than the estimated cost to the state to complete the reclamation of the disturbed land. A public or governmental agency shall not be required to post a bond under the provisions of this act. A blanket performance bond covering two (2) or more operations may be accepted by the board. Such blanket bond shall adequately secure the estimated total number of acres of disturbed land. When determined by the department that the set bonding level of a permit or license does not represent the present costs of reclamation, the department may modify the bonding requirements of that permit or license.*
>
> *No bond filed in accordance with the provisions of this act shall be released by the department until the provisions of this act, the rules adopted pursuant thereto and this reclamation plan have been fulfilled.*

Kaiser Cement and Gypsum Corporation has submitted a performance bond to the Department in the amount of $250,000 for the 250 acres proposed to be disturbed for mining related activities and $90,000 for the remaining 450 acres to be disturbed for associated activities. If KC&GC at any time intends to disturb any of the 450 acres of associated disturbance, a map showing the additional acreage to be disturbed will be sent to the Department along with an appropriate amount of increased bond as determined by the Department.

13. Future Expansion

Appendix B contains calculations provided by KC&GC regarding the potential

expansion of the proposed mine site and life of the mining project. Current projections based upon a 48 acre mine indicate a 78 year life. The pit could be expanded easily within the proposed 250 acres of bonded mining level disturbance to a 318 year life as discussed in Appendix B. Further expansion beyond the 250 acres of anticipated mining level disturbance to the full dimension of the proposed operating permit boundary is also possible, but the time frame involved removes the practical reference.

Kaiser Cement and Gypsum Corporation states the following regarding the possibility of expansion:

> *Assuming the demand for our product continues to grow, it is possible that the production capability of the Montana plant will be expanded to meet the market. Based on the production unit scale of this industry, a doubling or even tripling of the current capacity is reasonable.* (Letter, 12/18/78)

B. Proposals for Other Developments in the Area

At the time of preparation of this document a private party has expressed to the Jefferson County Planning Board an interest in pursuing plans to develop a 100 unit residential trailer park subdivision adjacent to the eastern boundary of the proposed permit area and Federal Aid Secondary Road No. 518.

All of the lands on the east side of Interstate Highway 15 in the vicinity of the proposed mining project are presently subdivided and being sold for residential dwellings. In addition, the Diehl Corporation has completed a long range land use capability study for further residential development of those lands adjacent the proposed permit boundary and including most of those lands located northward to the city of Helena.

The Department has received an application for a 7 acre silica open-pit mine to be located in upper Holmes Gulch (T9N, R3N, S9) of the proposed KC&GC permit boundary. The application states a possible 40 acre distrubance during the life of the mine. The Department is presently reviewing the application.

II. DESCRIPTION OF THE EXISTING ENVIRONMENT AND ENVIRONMENTAL IMPACTS OF THE PROPOSALS

A. Introduction

The following text contains a discussion of those environmental categories which have been determined to have the potential for impact resulting from the proposed mining project. An inventory of those items not anticipated to be affected by the proposed project is not presented in this document.

B. The Physical Environment

1. Topography

The proposed permit area is bordered by rolling foothills. Elevations range from 4,200 feet to 4,800 feet. The topography is flat rolling hills covered with sagebrush, and where favorable soil conditions exist, the ground is covered with native grasses, and very sparse scattered timber. The permit area does not contain any streams or natural springs.

When mining of economic limestone reserves has been completed, KC&GC plans to grade waste dump slopes into the natural topography contour and revegetate them, with 2:1 slopes where possible, (Figure I-3). Following grading of dump slopes, the disturbed areas will have a layer of topsoil, as available, placed on them and be reseeded with acceptable grasses. Contour benches will cut across reseeded slopes to prevent erosion damage and allow revegetation to be accomplished. Because of the closeness of the limestone reserves to the surface, it is not anticipated that mining will produce significant amounts of waste rock and material.

The waste dump and topsoil stockpiles will add topographic features to the existing landscape of the area during the mining project. These features, however, will be reduced during final reclamation, and because of the existing diverse topography at the site, the remaining features should not represent a significant adverse topographic impact.

Disturbed areas other than waste dumps, and mine haul roads outside of the pit will be graded into the natural topography, reseeded and have a layer of topsoil placed on them. Erosion will be controlled by contour trenches until revegetation can be established in these areas.

Under present long range plans, a long oval shaped void, measuring approximately 1,400 feet wide by 1,500 feet long by 250 feet deep will exist at the mine site following reclamation. The pit will consist of a series of benches approximately 30 feet wide and 25-30 feet high beginning at ground level on the high side (4,500') and ending at the bottom of the pit which is anticipated to be at about 4,100' in elevation or about 200 feet below ground level at the low (southeast) side of the pit. This feature will represent a significant alteration of the existing topography at the site.

2. Geology

Outcrop geology shows the area is underlain by a sedimentary section

ranging in age from middle Cambrian to Pennsylvanian and Permian. The target rock with respect to mining is the Mississippian Madison Group of limestones which includes the upper Mission Canyon Formation and basal Lodgepole Formation. Other sedimentary strata occurring on the property beginning with the oldest rocks includes the Middle Cambrian Meagher Limestone and Park Argillite, the Upper Cambrian Hasmark Dolomite and the Red Lion Formation which contains interbedded limestone, dolomite, and metamorphosed argillates. Proceeding up section there is the Upper Devonian Jefferson Formation of alternating dolomites and limestone, the Upper Devonian and Lower Mississippian Three Forks Formation comprising calc hornfels, black shale and fossiliferous green shale. Above this is the previously mentioned Madison Group which underlies approximately one-half of the subject area. Lying above the Madison is the Pennsylvanian-Permian Quadrant Quartzite and Phosphoria Formation. In general, a thin soil mantle covers the area but numerous outcrops allow for easy identification of the various formations. Northeast trending faults have offset the sediments into nominal fault blocks but the beds generally maintain a northwest strike and southwest dip of from 35 to 55 degrees. A small rhyolite flow caps a hill on the east boundary of Section 15. Proximity to the Boulder batholith located one mile west of the property has resulted in recrystallization of the Upper Madison limestone to white calcite. Quarternary gravels are present in areas of low topography.

With the exception of the physical removal of portions of the ore deposits, resulting in a reduction of identified mineral resources, the proposed projects would have no direct impact upon the geology of the area.

3. Air Quality

Sources of pollution which affect the existing air quality of the proposed mining project area have been identified by the Diehl Corporation in their report and are listed below:

1. The East Helena industrial complex.
2. The Kaiser Cement Plant in the Montana City area.
3. Emission sources in the urbanized area of Helena.
4. Interstate Highway 15 bordering the site.
5. Open burning.
6. Unpaved streets and roads.
7. Soils void of vegetation.

The East Helena industrial complex consists of the ASARCO Inc. lead smelter, The Anaconda Company zinc plant and the American Chemet Company paint pigment plant. These operations collectively account for over 99 percent of all sulfur dioxide (SO_2) emissions and a large percentage of all particulate emissions in the Helena Valley and are the principal air pollution sources affecting the project area. (Diehl Development Corporation, 1973)

Of the above pollutants, sulfur dioxide is the most widely disbursed and has the most impact on the project site. Sulfur dioxide and its oxidation products have been associated with adverse health effects and adverse effects on vegetation (Montana Department of Health and Environmental Sciences, 1979). Adverse affects of sulfur dioxide upon Ponderosa pine trees in areas adjacent to the proposed mining permit area have been recently documented (Driear, 1978).

The potential for adverse affect of sulfur dioxide upon human health increases in the presence of increased particulates. The proposed waste dump, mine site, and haul roads will produce additional dust particulate, the influence of which, separately or in combination with sulfur dioxide, as a contribution to respiratory diseases and ailments of the human population in the immediate vicinity of the proposed operation is unknown.

Harry Keltz, Environmental Engineer for the Air Quality Bureau of the Montana Department of Health and Environmental Sciences stated the following regarding the potential for air quality impacts:

> *About the only problems we see from an air quality standpoint are increased length of haul roads and blasting which would create TSP (total suspended particulates) problems. However, these could be minimized, at least the haul road dust by watering when necessary. Watering during the winter months would not be feasible even if the area was devoid of snow cover. Possibly some oil suppression may be necessary during the dry cold months, although I am not convinced that this would be totally workable.*

Air inversions which occur in the area, particularity during the autumn and winter months, have the potential to trap the increased particulate matter from the mine and related activities, thereby reducing visibility in the area and contributing further to the adverse affects on the aesthetics of the airshed during these periods. Existing residential vehicle travel over the gravel and sand county roads during these periods in the morning and evening hours creates a reduced visibility and adverse aesthetic situation in the area of the proposed mining operations.

4. Soils

Soils data for the proposed permit area were obtained from the Lewis and Clark office of the Soil Conservation Service. As found on the soil associations map (Figure I-4), the map units are not soil series, but rather soil associations or soil complexes. Soil association names are derived from the dominent soil series of the association or from codominant soils. Map unit descriptions follow each soil associations description.

Map Unit 161 DE - Niarada-Castner channery loams, 8 to 45 percent slopes

This mapping unit consists of strongly sloping to steep Niarada and Castner soils on uplands and mountains in the central part of the survey area at elevations of 4,500 to 5,500 feet.

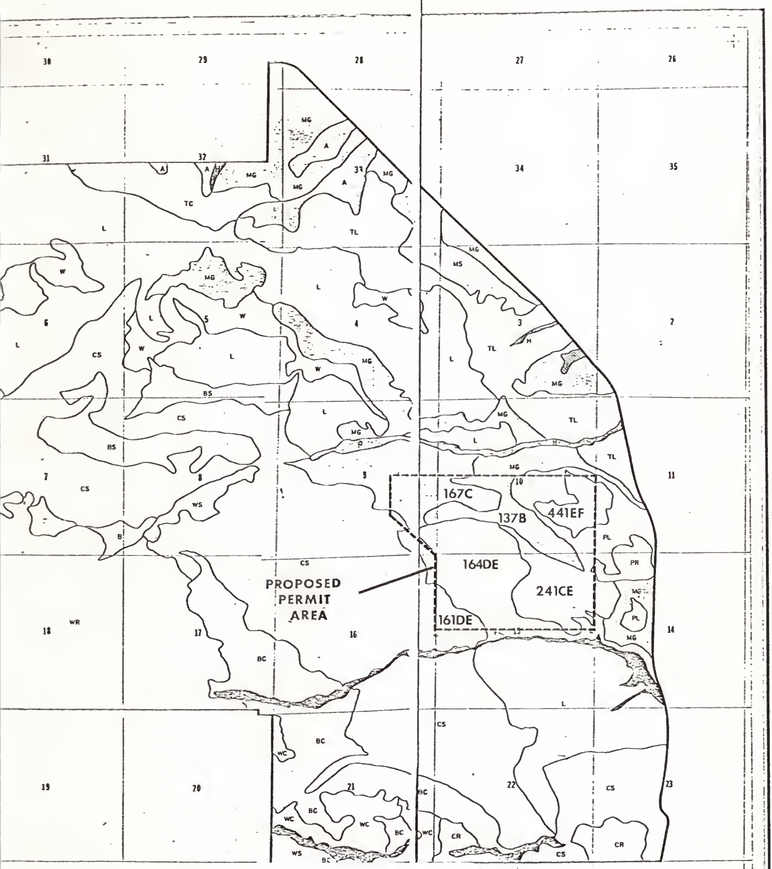


Figure I-4. Soils in the Proposed Permit Area.

Permeability is moderate. The available water capacity is low. The effective rooting depth is about 60 inches. The average annual wetting depth of the soil under native vegetation is about 40 inches. The surface runoff is rapid, and the erosion hazard is moderate from wind and severe from water.

Included with these soils in mapping are small areas of similar soils with bedrock at a moderate depth, and Hilger soils. These inclusions would not have an adverse affect on the use and management of this unit.

The Niarada soil is a deep, well drained soil. It formed in material weathered from igneous and sedimentary rock on side slopes of hills and mountains.

The Castner soil is a shallow well drained soil. It formed in material weathered from igneous and sedimentary rock on ridges and upper side slopes of hills and mountains.

Permeability is moderate. The available water capacity is very low. The effective rooting depth is about 12 inches. The average annual wetting depth of the soil under native vegetation is about 12 inches. The surface runoff is rapid, and the erosion hazard is moderate from wind and severe from water.

These soils are not suited to the use of farm machinery for range renovation and seeding because of steep slopes and the shallow depth to bedrock of the Castner soils.

Map Unit 164 DE - Windham-Lap channery loam, 8 to 45 percent slopes

This mapping unit consists of strongly sloping to steep Windham and Lap soil on uplands and mountains in the southern part of the survey area, at elevations of 4,500 to 5,500 feet.

Included with these soils in mapping are small areas of rock outcrop. They make up about 2 percent of this unit. Rock outcrop occurs on ridges and upper side slopes. Rock outcrop areas have no value for grazing.

The Windham soil is a deep, well drained soil. It formed in material weathered from limestone on side slopes of hills and mountains.

Permeability is moderate. The available water capacity is low. The effective rooting depth is about 50 inches. The average annual wetting depth of the soil under native vegetation is about 60 inches. The surface runoff is rapid, and the erosion hazard is moderate from wind and severe from water.

The Lap soil is a shallow well drained soil. It formed in material weathered from limestone on ridges and upper side slopes of hills and mountains.

Permeability is moderate. The available water capacity is very low. The effective rooting depth is about 14 inches. The average annual wetting depth of the soil under native vegetation is about 14 inches. The surface

runoff is rapid, and the erosion hazard is moderate from wind and severe from water.

These soils are not suited to the use of farm machinery for range renovation, seedbed preparation, and seeding because of steep slopes, coarse fragments, and the shallow depth to bedrock of the Lap soil.

Map Units 241CE and 441EF - Pensore-Rock outcrop complex, 15 to 60 percent slopes

This mapping unit consits of moderately steep to very steep Pensore soils and rock outcrop in the southern part of the survey area at elevations of 3,800 to 5,500 feet.

Included with these soils in mapping are small areas of Roto and Crago soils. They make up about 25 percent of this unit. The Roto soil is moderately deep to bedrock, and the Crago soil is deep. They are on side slopes and foot slopes.

The Pensore soil is a shallow, well drained soil. It formed in material weathered from limestone.

Permeability is moderate. The available water capacity is very low. The effective rooting depth is about 18 inches. The average annual wetting depth of the soil under native vegetation is about 18 inches. Surface runoff is rapid, and the erosion hazard is moderate from wind and severe from water.

This soil is not suited to the use of farm machinery for seedbed preparation and range renovation due to steep and very steep slopes and shallow depth to bedrock.

Map Unit 137B Musselshell-Crago complex, 2 to 8 percent slopes

This mapping unit consists of gently and moderately sloping soils on uplands in the southern part of the survey area at elevations of 3,800 to 4,500 feet.

Included with this complex in mapping are small areas of Amesha soils. This inclusion makes up about 15 percent of this unit. Amesha soils occur in undifferentiated patterns on the landscape. They contain less gravel than the other soils and would not have an adverse affect on the use and management of this unit. Some cobble size fragments are on the surface of these soils in some areas.

The Musselshell soil is a deep, well drained soil. It formed in calcareous alluvium.

Permeability is moderate. The available water capacity is moderate. The effective rooting depth is about 50 inches. The average annual wetting depth of the soil under native vegetation is about 30 inches. Surface runoff is medium, and the erosion hazard is moderate from wind and water.

The Crago soil is a deep, well drained soil. It formed in gravelly calcareous alluvium.

Permeability is moderate to 32 inches and moderately rapid below. The available water capacity is low. The effective rooting depth is about 50 inches. The average annual wetting depth of the soil under native vegetation is about 30 inches. Surface runoff is medium, and the erosion hazard is moderate from wind and water.

This soil is suitable for the use of farm machinery for seedbed preparation, seeding of adapted grasses and legumes, and range renovation.

Map Unit 167C Hilger stony loam, 8 to 35 percent slopes

This deep, well drained strongly sloping to steep soil is in the southern part of the survey area. It formed in calcareous alluvium on uplands at elevations of 4,200 to 5,500 feet. Slopes are mainly 500 to 1,500 feet in length.

Small areas of Castner soils were included in mapping. These strongly sloping to steep soils occur on some ridge tops. They are shallow to bedrock and produce less vegetation than the Hilger soil.

Permeability is moderate. The available water capacity is moderate. The effective rooting depth is about 60 inches. The average annual wetting depth of the soil under native vegetation is about 40 inches. Surface runoff is rapid, and the erosion hazard is moderate from wind and severe from water.

This soil is not suited to the use of farm machinery for range renovation and seedbed preparation because of cobbly and stony surfaces and slopes greater than 15 percent.

The potential environmental impacts to the soils of the proposed permit area include (1) direct soil disturbance and soil compaction during mining, and associated disturbance and, (2) soil erosion from areas during the above activities that have no or inadequate soil erosion prevention measures applied. The proposed reclamation plan discussed on pages 8 through 13 adequately provides for the protection of the soils resource in the proposed permit area. The lack of significant areas of steep slope within the area proposed to be disturbed by the mining operation will reduce the risk for soil erosion. In addition, periodic inspection of the operating mine site by departmental personnel to determine compliance with the requirements of the mining and reclamation plan will aid in preventing the possible occurrence of significant soil erosion problems. Successful reclamation and revegetation of disturbed areas will further reduce the risk for long-term adverse impact to the area's soil resource. It should be noted that the high content of coarse fragments that will be part of the stockpiled topsoil material should not impede revegetation. On reclaimed areas where slopes are less than 5 percent these fragments would provide stability to the surface layer and serve to retard erosion.

5. Surface Water Quality

The proposed permit area contains several drainages that contain sur-

face water only periodically, primarily during spring snowmelt and high intensity rainfall episodes. Flow in these drainages can be significant, however it is usually of short duration. Of concern during these periods is the location of the proposed waste dump and topsoil stockpile area. The proposed area for these facilities is immediately adjacent to the primary intermintent drainage in the permit area. Unless proper protective measures are established in this area, the topsoil stockpiles and waste dump could contribute a substantial increased sediment load to the intermittent drainages of the area. Additionally, all haul road crossings of these drainages will require installation of adequate culverts or other drainage control devices to reduce the threat of increased sedimentation during periods of snowmelt or rainfall.

Overland surface flow, which is common in this area during snowmelt or intense rainfall events, may contact other areas of mining related surface disturbances and carry sediments into adjacent drainages. Major precipitation events would then have the potential to transport the increased sediment load in these drainages to Prickly Pear Creek. Increased subdivision activities in adjacent areas presently results in increased sediment transport to Prickly Pear Creek from other drainages.

6. Groundwater Quality

Exploratory drilling to depths of 300 feet by KC&GC within the proposed permit area has not revealed significant amounts of groundwater. Several drill holes, however, encountered groundwater considered to be perched aquifers of small magnitude. In the process of mine pit development it is anticipated that some of these small areas of groundwater will be intercepted or removed.

The exposure of large amounts of the limestone ore within the pit to precipitation or other waters would not significantly affect the quality of the groundwater system in the area. Mining at an expanded rate, however, might affect the quantity of water presently entering Jackson Creek in the form of seeps or springs. Although the potential for this influence has not been researched, it is not considered to be significant, being largely dependent upon the ultimate size of the mine pit.

B. The Biological Environment

1. Flora

Vegetation information contained in this section of the EIS was obtained from a report compiled for the Diehl Development Corporation (1973) as a portion of a long-range land use capability study encompassing 13,436 acres which includes the proposed mine permit area. The following discussion includes the vegetation present on the permit area as well as some types adjacent to the area but considered relevant in describing the permit area.

Present vegetation communities were determined from field observations. Species identification was facilitated by many sources. Structural form of the vegetation was patterned after the work of Dansereau. Vegetation community and habitat typing was accomplished through methods derived from Daubenmire, Pfister, Oosting, Stoddart, Smith and Foote.

The resulting "habitat types" are as follows (from generally moist to dry):

- Bitterbrush-rough fescue brush
- Rough fescue-Idaho fescue prairie
- Rough fescue-Bluebunch wheatgrass prairie
- Idaho fescue-rough fescue prairie
- Bluebunch wheatgrass-sandburg bluegrass prairie
- Needle and thread grass-sandburg bluegrass short grass steppe
- Needle and thread grass-blue grama grass short grass steppe

Forest habitat types developed by Pfister and found on the project site or adjacent to it include (from generally moist to dry):

- Ponderosa pine-snowberry forest
- Douglas fir-rough fescue forest
- Douglas fir-bluebunch wheatgrass forest
- Ponderosa pine-rough fescue forest
- Ponderosa pine-bluebunch wheatgrass forest

Based on Daubenmire's comments on zootic climaxes, the range site descriptions of the SCS and the ecology of the species present, two zootic habitat types are described:

- Douglas fir-bluegrass spp. forest
- Bluegrass spp.-prairie junegrass prairie

Three anomolous "habitat types" are described. The Douglas fir, stagnant state; and ponderosa pine, stagnant state types are areas where the trees are so thick and the needle-duff layer beneath so deep that virtually no undergrowth is present. Finally, there are areas, generally with rock outcrops, where both Douglas fir and ponderosa pine occur together and both are likely to persist. This type was called mixed conifers-bluebunch wheatgrass woodland.

The spatial organization of these habitat types is not easily generalized. On the steep north slopes, deep protected ravines and high pocketed areas are found the most moist type--Douglas fir-snowberry. And on the gentlest, sandiest, most unprotected areas are found the driest type--needle and thread grass-blue gramma grass. In between, depending on the interacting factors of slope, aspect, altitude, wind intensity, rainfall amounts, grazing pressure and etc., are found all

the interum habitat types. However, the brushy habitat-types tend to be found on rockier sites than their prairie counterparts, while the rose spp. types tend to be located along or near drainageways.

There are a few species of plants of special note found throughout the area that escape mention in the accompanying text. In many of the drier drainageways, wax currant and skunkbush share the importance of rose spp. Wax currant and another "spiny" currant are found throughout the study area and are good sources of berries for birds. Also in the drainageways, basin wild rye, green needle grass and green wheatgrass are found with the dominant bluegrass spp. Rocky mountain juniper is abundant throughout the area, especially on the drier ponderosa pine sites. While on the very driest ponderosa sites of knobby hills, limber pine is significant. Important browse species of the dry grasslands include silver sagebrush and winterfat; and in the moist draws are found rocky mountain maple, mock orange and chokecherry. Overgrazing and/or severe disturbance (e.g., cultivation) is evidenced by broom snakeweed and/or prickly pear on the drier sites and lupine on the more moist areas.

The major impact to the flora would be the destruction of the vegetation in all disturbed areas of the proposed operation. Areas where the vegetation would be removed include the pit area, waste area, facilities and roads.

The proposed permit area does provide habitat for wildlife. Browse and cover in the disturbed areas would be removed and wildlife would be displaced until the areas were revegetated and valuable food plants were reestablished.

Undesirable invaders will probably proliferate on disturbances caused by the operations and, although they will have the beneficial aspect of holding soils and building soil organic matter, they have the detrimental properties of competition with more desirable species and propogation of a seed source for further distribution.

Native vegetation and reclamation areas in the vicinity of the pit, waste area, soil stockpiles, facilities and along roads will be affected by dust. Dust arising from these activities will affect vegetation to an unknown degree. It is expected that dust from all operations except roads will not be significant enough to cause damage. Road dust accumulation may affect the photosynthetic process causing a decrease in distribution of sensitive species.

2. Terrestrial Fauna

Wildlife information contained in this section of the EIS was obtained from a report compiled for the Diehl Development Corporation by Karen Zackheim (1973) as a portion of a long-range land use capability study encompassing 13,436 acres and including the proposed mine site.

The analysis of potential impact to wildlife species as a result of the proposed mining project is based upon the limited wildlife use data contained in the Diehl report, and is not to be considered conclusive, but rather based upon the best information currently available.

Wildlife occuring in the proposed permit area include those species normally associated with a typical east slope ponderosa pine/blue bunch wheatgrass habitat type (Hoffman and Pattie, 1968). Small herbivores include ground squirrels, red squirrels, chipmunks, rabbits and several species of mice and voles. Carnivores include red fox, weasel, stripped skunk, badger and coyote. Large mammals including white-tail deer, mule deer, and antelope use the area as well as numerous species of birds (Skaar, 1975). The area is also utilized for grazing by domestic livestock. Appendix C contains a letter from the Department of Fish and Game that contains comments regarding impacts to the wildlife of the proposed permit area.

It is doubtful that the increase of human and equipment activity associated with the new mine would represent a significant disruptive impact on wildlife with the exception of antelope as discussed below. Expanding homesite development occurring nearby presently influences wildlife habitat use in the area of the proposed permit.

The proposed permit area does not contain habitat suitable for aquatic species.

A further discussion of major wildlife species follows.

a. Pronghorn Antelope

A herd of approximately 16 to 24 pronghorn antelope ranges the foothills of the southeast Helena area and is occasionally seen by travelers on Interstate-15. The open grasslands in this area provide excellent forage for these animals. Antelope are primarily open plains animals requiring large expanses of sagebrush-grasslands relatively free of human activity. Their diet consists largely of sagebrush and forbs the year-round.

The southeast Helena area serves an an important feeding ground for antelope, providing the necessary forbs and sagebrush. Antelope were observed in open grasslands 95 percent of the time and under cover or at watering spots the other times. The proposed permit area thus offers suitable and apparently desirable antelope habitat which is not available everywhere, for example in more densely forested areas.

The antelope habitat use map supplied with the Diehl report indicates that the proposed KC & GC permit area would encompass a significant portion of the heavily used Martinez-Holmes Gulch areas. The proposed mining plan would permanently remove 48 acres of habitat from production. In addition, approximately 33 acres would be committed to use for waste

dumps and soil stockpile during the mining operation. Reclamation may return these areas to productive habitat. It is unknown to what extent the proposed fencing of the 700 acre permit area would have on use by antelope. Impacts to the antelope would include displacement due to mining activities, the possible reduction of the existing herd through competion for the declining amount of remaining habitat, and stress. If mining was to occur at an expanded rate there would be an increased potential for a significant reduction in the amount of available antelope habitat with a potential result of a reduction of the number of antelope occurring in the area.

b. Mule Deer

Mule deer are the most abundant big game species in the area of the proposed mining operation. According to the Department of Fish and Game personnel, approximately 50 mule deer inhabitat the southeast Helena hills. This land provides good browse and cover throughout the year. Mule deer are generally associated with open, coniferous forests which are abundant in the area. Rarely are these deer seen in dense forests or river bottoms.

Mule deer use the same general areas of Martinz-Holmes Gulches and Clark Gulch-Jackson Creek as antelope. However, mule deer are generally observed in the forested areas on ridges or along drainages where a substantially greater percentage of cover is available than in the habitat preferred by antelope. The Clark Gulch-Jackson Creek area is more heavily used than Martinz-Holmes Gulches.

Interpretation of the mule deer habitat use map contained in the Diehl report indicates that the proposed mine site and haul routes would not be located in the areas heavily used by, or critical to mule deer. Potential impacts to mule deer would include displacement by activities associated with mining, loss of use of the area for the duration of the mining, and loss of habitat as described for antelope.

c. White-tailed Deer

No data are available regarding white-tailed deer numbers in the study area, although they are regularly seen by residents along Jackson Creek and Prickly Pear Creek. Both of these streams provide the dense riparian habitat preferred by this species. It is not anticipated that the proposed mining project would adversely affect white-tailed deer.

d. Black Bear and Mountain Lion

Area residents have often seen black bear in the Clark Gulch-Jackson Creek drainages and mountin lions are occasionally seen in this area. No data is available regarding population levels or habitat preference. It is anticipated that increased human activity associated with the mining operation may reduce the frequency of occurrence of

these species in this area, but the extent of the effect is unknown.

e. Birds

Upland game birds possibly inhabiting the proposed permit area include ruffed grouse, Hungarian partridge, and wild turkeys. These birds are found primarily in the upper portions of the Holmes Gulch and Clark Gulch drainages. Waterfoul observed near the proposed permit area include mallards, blue and green winged teal, shovelers, goldeneye and Canada geese. These birds are spring and summer residents of Prickly Pear and Jackson Creeks, and the few ponds in the area. The two streams are used for nesting and rearing young in the spring and early summer. No information is available on population density or states of these species.

Over 50 species of nongame birds may occur in the study area, although only 22 have been observed (Table II-1). At least seven species of raptors inhabit the general area. Although no nests have been found, several species probably nest in adjacent areas including the golden eagle, great-horned owl and saw-whet owl. The golden eagle is probably the most unique bird frequenting the study area and is included in the Department of Fish and Game's January, 1978, list of "Nongame Species of Special Interest or Concern" for this area of the state. Also included on that list are the marsh hawk and saw-whet, pygmy and long-eared owls.

C. The Social and Economic Environment

1. Land Use

Land use in the proposed permit area presently includes seasonal open grazing by livestock, wildlife habitat, and limited recreational use for hiking and winter related activities such as snowmobiling and cross-country skiing. In addition, a portion of the Clark Gulch/Jackson Creek County Road is included in the proposed permit area (Figure I-2). Use of adjacent areas includes one commercial site (small grocery store and gas pump facilities), scattered home sites along Clark Gluch, more densely situated home sites and planned homesites (east side of Interstate Highway 15), a proposed high density 100 unit trailer park subdivision immediately adjacent the eastern boundary of the proposed permit area, and a proposed 7 acre open-pit silica mine located in S9, T9N, R3W.

If the proposed mining project is approved, the permit area would be fenced to assist in revegetation efforts and to aid in safety promotion, thereby restricting future access to the area by livestock, larger wildlife species, and recreationalists. Kaiser Cement and Gypsum Corporation have indicated in their application to the Department that the proposed reclaimed use of the project area would be grazing by livestock and wildlife habitat. Reclamation, if successful would exclude the use of the 700 acres of permit area for these activities only for

Table II-1. Bird Species Observed in the General Area of the Proposed Permit Area (Diehl, 1973).

golden eagle	*Aquila chrysaetos*
marsh hawk	*Circus cyaneus*
red-tailed hawk	*Buteo jamaicensis*
great-horned owl	*Bubo virginianus*
long-eared owl	*Asio otus*
short-eared owl	*Asio flammeus*
saw-whet owl	*Aegolius acadicus*
pygmy owl	*Glacucidium gnoma*
wild turkey	*Meleagris gallopavo*
blue grouse	*Dendragapus obscurus*
ruffed grouse	*Bonasa umbellus*
Hungarian partridge	*Perdix perdix*
mallard	*Anas platyrhynchos*
green-winged teal	*Anas carolinensis*
blue-winged teal	*Anas discors*
shoveler	*Spatula clypeata*
common goldeneye	*Bucephala clangula*
Canada goose	*Branta canadensis*
eared grebe	*Podiceps caspicus*
American avocet	*Recurvirostra americana*
common nighthawk	*Chordeiles minor*
common snipe	*Capella gallinago*
killdeer	*Charadrius vociferus*
horned lark	*Eremophila alpestris*
western meadow lark	*Sturnella neglecta*
robin	*Turdus migratorius*
nuthatch	*Sitta sp.*
black-capped chickadee	*Parus atricapillus*
yellow warbler	*Dendroica petechia*
Macgillivray's warbler	*Oporornis tolmiei*
bluebird	*Sialia sp.*
hairy woodpecker	*Dendrocopos villosus*
downy woodpecker	*Dendrocopus pubescens*

the duration of the project. The exception would be the area occupied by the mine pit, which would remain a fenced, terraced pit following mining and not be reclaimed to its prior land use.

Future expansion of the mine pit beyond the 48 acres presently anticipated may require relocation of the existing Clark Gulch/Jackson Creek County road that provides access to homesites along Clark Gulch. Relocation of the road would alter the existing use of this area and perhaps cause a temporary inconvenience to residents using the road for access.

2. Income, Employment and Taxes

Present employment at the Montana City plant and quarry averages 87 persons on a year-round basis. Salaries and wages total approximately $1,300,000 annually. A slight increase in employment (3 or 4 employees) would be required for the proposed new mining operation. Federal and state income taxes are paid on the wages earned by Kaiser employees.

There are five separate taxes in Montana which apply directly to the proposed Kaiser Cement and Gypsum Corporation expanded mining operations. These taxes and the amount of revenue generated by KC&GC in 1977 are summarized in Table II-2.

Table II-2. Annual Tax Revenue Generated in 1977 by Kaiser Cement and Gypsum Corporation.

Property Tax	$172,307.00
Gross Proceeds Tax[1]	31,256.00
Resource Indemnity Trust Tax[2]	2,280.00
Corporation License Tax[3]	64,657.00
Cement Importers License Tax[4]	69,632.00
TOTAL	$340,132.00

[1] Gross Proceeds Tax - The Gross Proceeds Tax functions as a property tax on minerals extracted from a county. A county-wide mill levy is applied against the taxable value of mine production. This taxable value represents 3 per cent of the merchantable (market) value of the ore.

[2] Resource Indemnity Trust Tax - The purpose of the Resource Indemnity Tax is to make money available to improve the total environment and rectify damage caused by past mining operations. The tax is applied to all mining activity in the state. Its rate is one-half of one percent of the gross value of a mine's production.

[3] Corporation License Tax - The Corporation License Tax is in reality a corporate income tax levied by the state. The license fee is derived as

a percentage (6.75%) of a corporation's annual net income. Revenue generated by the tax is allocated to the state's general fund.

[4] Cement and Gypsum Importers License Tax - This tax is levied by the state at the rate of $0.22/ton of cement produced. Revenue generated by the tax is allocated to the state's general fund.

An increase in tax revenue as a result of approval by the Department of the proposed mining plan has been estimated as follows:

	Market Value	Taxable Value	Property Tax
New Equipment -	$845,000	$117,00	$24,000
Property -	155,000	50,000	10,000
		Total Additional Taxes	$34,000/Year

The conversion from natural gas fired furnaces to coal currently taking place at the Montana City Plant will affect the property taxation revenue in the future, but to what extent is unknown at this time. All other tax revenue as a result of the mining proposal should remain approximately equal, since the amount of product produced will remain the same.

Failure to approve the proposed mining operation would result in the necessity to import limestone rock to the Montana City plant from other sources. This would significantly reduce the economic viability of the plant and possibly force its closure. Closure of the Montana City plant would result in a loss of the identified tax revenues to Jefferson County and the State of Montana, with an attendant lay-off of the operational employers. The employees would be unemployed, resulting in a loss to the community of the wages and salaries described above. In addition, the expense of unemployment compensation for the unemployed workers would be required of the state of Montana.

3. Human Health and Safety

The proposed mine waste dump and roads may produce additional dust particulate, the influence of which as a contribution to respiratory diseases and ailments of the human population in the immediate vicinity of the proposed operation is discussed in the Air Quality section of this EIS. Dust abatement and proper management of the exposed waste materials in the dump should mitigate this potential health hazard.

The proposed mine and dump area may also constitute an "attractive nuisance" in the area and could cause injury or loss of life to individuals who trespass into the mine area during the life of the proposed operations. To assist in revegetation efforts and to aid in safety promotion, the permit area will be fenced to further restrict access to the area by both livestock and people.

Transportation of the limestone from the mine site to the Montana City Plant will involve approximately 80 round trips daily by loaded 25 ton bottom dump trucks. The haul route will begin on the Clark Gulch/Jackson Creek County road, cross the interstate frontage road, and proceed on Federal Aid Secondary highway #518 to the Plant site, a distance of approximately 2½ miles. With the exception of the Clark Gulch/Jackson Creek County road, this route will be shared with heavy residential and commercial traffic; of particular concern is the intersection of FAS 518 and the McClellan Creek road. This intersection provides the only access from FAS 518 to the Montana City School located adjacent to the intersection and the several large residential subdivisions located along the McClellan Creek road. Traffic data for March, 1978 provided by the Montana Department of Highways indicates an estimated average daily traffic rate of 535 vehicles at this intersection. Since that time additional housing development has occurred along the McClellan Creek road and residential as well as construction related traffic has increased. Additionally, traffic data indicates that an estimated average daily traffic rate of 1,060 vehicles used FAS 518 in March, 1978 along that portion of the haul road from the McClellan Creek intersection to the Northbound entrance ramp of Interstate Highway 15. The addition of 80 trips daily of loaded haul trucks would contribute significantly to the creation of a hazardous situation along this section of FAS 518, particularily during peak traffic periods at the McClellan Creek intersection, and the Interstate Highway 15 northbound entrance ramp.

4. Archeological and Historic Sites

The proposed permit area is located in an area of abundant recorded archaeologic sites (Dr. Dee Taylor, Department of Anthropology, University of Montana, Personal Communication). Excavation of the MacHaffie archeological site, approximately 1½ miles east of the proposed permit area, revealed a use of the area by prehistoric peoples spanning approximately 10,000 years. Primary attraction to the area for these peoples was the abundance of material suitable for weapon and tool manufacture, as well as the presence of numerous bison.

Kaiser Cement and Gypsum Corporation contacted the Department of Anthropology at the University of Montana and requested that they conduct an archeological survey of lands contained in the proposed permit area. The survey produced a preliminary report (Munday, 1978) regarding the archeological occurrences found, along with recommendations for future work. The report is concerned primarily with the location and characteristics of the archeological sites and only minimally refers to their environmental context.

Thirty-seven archeological occurrences were found in the research area. Thirty-three prehistoric occurrences, two historic homesteads, one potential historic burial, and an archeological feature of unknown age and context were found. Most of the prehistoric occurrences are

small chippage scatters. Two occurrences are relatively large in area and contain non-randomly distributed dense artifact concentrations. Almost all prehistoric occurrences were located adjacent or very close to gullies or drainages that seasonally hold water. Of the homesteads, one is located in a sheltered depression adjacent to Clark Gulch and one is located adjacent to a minor drainage in the northwest part of the research area. Two prehistoric occurrences are characterized by subsurface deposits; one was found eroding from a road cut, and the other where the surface soil has been turned over during the construction of a drainage ditch. Relatively high artifact densities were also encountered on those areas plowed earlier this century. This suggests that considerable subsurface deposits may lie in the area.

As a group, the archeological occurrences in the project area make up a "useful" package of sites that compliment each other. They compliment each other because there are a large number of small, apparently ephemerally occupied sites, and a small number of large sites that exhibit intrasite variability in lithic distributions. Possibly, the larger sites are composed of aggregations of sites representative of the smaller occurrences; alternately, they may represent unique patterns of lithic debris not found in the smaller occurrences. If the former is the case, the larger sites may represent conglomerations of smaller occurrences and hence only areas where a variety of small-scale activities were carried out. If the larger sites do not exhibit the same or similar patterns of material culture as that found at the small localities, the former may represent different kinds of sites, i.e. occupation sites, than the localized activity areas represented by the latter. (Munday, 1978)

Using the results of the archeologic survey, KC&GC designed and located the proposed mine pit and associated facilities in avoidance of the identified sites. The possibility of long-term expansion of the mine pit and associated facilities into areas of identified sites will require further evaluation and mitigation of archeologic resources at that time. No further evaluation of the identified sites is currently proposed by KC&GC. Appendix A&D contains letters from the Montana Historical Society and the Bureau of Land Management regarding the archeologic survey conducted by Fredrick Munday.

5. Visual Resources

The proposed permit area is visible from much of the area developed as homesites east of Interstate Highway 15. The Saddle Mountain residential area in particular would be adversely affected regarding the current visual resource as seen from that elevated area. The proposed mining project, although more than 2 miles distant, would represent a significant intrusion into the present visual resource located west of Interstate Highway 15, viewed from the Saddle Mountain area. This would be particularly so if the proposed mining were to occur at an expanded rate. Other areas of existing homesites nearer the proposed permit area may

also be adversely affected, although some screening of the project as viewed from these lower elevation sites occurs from local topographic features.

Visual impact would include a 48 acre terraced open-pit mine and the waste and topsoil stockpiles. Additionally, dust from the mining operations may contribute to a reduced visual resource in the area. The mine pit will not be reclaimed following completion of the project and will therefore continue to influence the long-term visual resource of the area.

D. Significant Adverse Impacts that Cannot be Avoided if the Proposals are Implimented

The major adverse impact that cannot be avoided is the creation of a large open-pit mine and associated waste rock stockpile in an area that is presently relatively undisturbed by development. The mining proposal would significantly affect the visual quality of the area as reviewed from nearby homesite developments, possibly reducing the desirability of these areas for prospective homesite purchasers.

In addition, the proposed mining plan would permanently remove 48 acres of antelope habitat from the heavily used Holmes Gulch area (Diehl, 1973). Impacts to the antelope would include displacement due to mining activities, possible reduction of the existing herd through competition for the declining amount of remaining habitat, and stress.

E. Relationship Between Short-Term Uses of Man's Environment and the Maintenance and Enhancement of Long-Term Productivity

The following discussion appraises the extent of long-term impairment or enhancement of resource values that would occur, given the proposed mining of limestone in the Holmes Gulch area. In this analysis of trade-off over time and trade-offs among resource values, short-term refers to that period of approximately 78 years during and immediately following the proposed operations when mining and reclamation are to take place. Long-term is that period during which consequent impacts, both adverse and beneficial, still affect the environment.

The proposed activities would result in a permanent change in topography at the mine site, thereby introducing long-term changes in related environmental factors affecting long-term productivity of the area. Changes in slope magnitude and slope aspect or direction would alter the local microclimate, producing corresponding changes in type, density and vigor of the plant cover. This in turn would affect infiltration, runoff, erosion and sedimentation, and productivity or carrying capacity for wildlife.

The proposed mining activities, would increase the total suspended

particulate levels in the air during the development and operation of the project. This would contribute to the air quality problems presently characterizing the surrounding areas. The cessation of this activity and successful reclamation would end the impact on air quality directly related to the project.

The proposed mining activity represents a relatively short-term productive use of the mineral reserves. The long-term effect on the productivity of the locatable mineral resource present will be a decrease in productivity until the mineral resource of the mine is totally depleted.

Soil disturbances as a result of the proposed action would alter soil characteristics and probably cause some long-term decline in soil productivity. Soil losses would occur from accelerated erosion on denuded and disturbed areas during operation and reclamation. Also, organic content and biological activity in the replaced surface layer would be temporarily decreased by mining soil and by stockpiling. Although there may be some minor changes in the soil productivity, permeability, infiltration and depth, the basic soil characteristics would be present to sustain the long-term productivity of the soils.

Because of the uncertainty regarding the characteristics of the ground-water flow and expansion of the mining proposal, the potential for the operation to have a long-term impact on the productivity or availability of the area's water resources is unknown.

The short-term use of the land to mine limestone could result in a long-term loss of biological productivity depending on the methods and success of reclamation. The present mining proposal would represent a permanent loss of biological productivity on 48 acres. If care is taken to salvage and replace all available topsoil, prevent erosion, and establish grasses, forbs, shrubs and trees adapted to the sites, post-mining biological productivity, with the exception of the mine pit, should eventually approximate existing productivity.

Species diversity will remain low after reclamation until natural reinvasion can increase the number of species occurring on the revegetated areas.

Wildlife is a function of habitat and habitat is a function of time. Habitat undergoes succession, gradually but continuously changing from one stage to another. Wildlife populations, in turn, change with the habitat. Any major disturbance of habitat interrupts this gradual succession, setting it back one or more stages. On a site-specific basis, the short-term use of the land to mine minerals is a major disturbance that will result in the long-term alteration of wildlife habitat on the areas to be disturbed. In effect, succession will begin all over on these sites.

Jefferson County's economic environment would undoubtedly receive direct stimulation through continued employment and mining production. The continued mining activity may also attract new commerce and bolster what now exists in Jefferson County. Thus, the long-term consequences beyond the mining lifetime may be favorable. On the other hand, without additional industry, a conclusion of the mining operation may lead to increased unemployment and economic decline. However, the projected length of mining productivity provides an opportunity to prevent the latter consequence through careful planning and economic promotion.

The archeologic and historic survey of the proposed permit area offered a short-term use of these resources. Long-term use of these resources is the record of this statement, and the report by Fredrick Munday which contains maps of the survey area and sites and historic finds. Long-term use of these resources is also exemplified in the report in the form of a recommendation that additional interpretive studies be undertaken in the future to determine the significance of the identified sites.

F. Irreversible and Irretrievable Commitment of Resources

It is possible that the proposed mining activity could irreversibly commit the entire limestone body within the permit area to depletion. Mineral deposits are unique, highly finite and valuable features of the earth's crust, formed by slow processes still active today. Mining of the mineral resources is a depletion of a resource that will require millions of years to be replenished, possibly never (localized) in the same area.

The land itself may be committed to other uses as a result of its initial commitment to the proposed action. Other uses for the mine may be identified and this would delay or halt restoration of the adjacent area.

The proposed mining of limestone and the reclamation of disturbed areas at the proposed mine site would require the use of liquid fuels in the form of diesel fuel and gasoline, ammonium-nitrate-base explosives, and structural and repair materials. In addition to fuel and explosives, an unquantifiable amount of chemicals and materials used in the mining and subsequent reclamation processes would also be irretrievably lost for other uses.

Unless the mine area and all associated facility sites are reclaimed to their condition prior to disturbances, the potential for reduced carrying capacity and lowered wildlife population levels must be considered a partial irretrievable commitment of the wildlife resource.

The present visual character of the proposed permit area may be considered one of the natural amenities important to residents of the general area. The intrusion of a large open-pit mine upon these values

can be considered an irretrievable commitment of this amenity since the pit will remain following reclamation.

The capital investment in plant and productive equipment at the mining termination is irretrievable and irreversible once committed, if no alternate usage can be found. Labor invested in mining ore is irretrievable once expended, but the labor commitment is reversible should a premature termination occur. Similar commitments and investments on a smaller scale may develop in the government, trade and service sectors of the local economy with congruent irreversible and irretrievable outcomes.

Such an investment and commitment of human and economic resources is required for any econonic activity. But unless the venture fails, this is a beneficial and necessary application of resources to continue employment and expand sources of personal income.

Archeological and historical sites or artifacts are nonrenewable and hence long-term resources. In the event that significant sites are not discovered and are destroyed during the mining process, the physical resource loss would be irretrievable. In addition to such a possible loss of physical resources, educational and scientific information regarding prehistoric environments and our cultural heritage would also be lost to both present and future generations.

III. MITIGATING OR COMPENSATING MEASURES

Three basic types of mitigating measures have been recognized as relative to the Kaiser Cement and Gypsum Corporation (KC&GC) proposals. They are: (1) measures required by Local, State, or Federal laws, regulations, or executive orders; (2) measures proposed by KC&GC as part of their mining and reclamation plan; and (3) other measures generally thought to have merit. The first two categories include those measures that are binding and and must be implemented upon approval of the proposal and issuance of the various agency permits associated with the mining proposals. By attachment of stipulations, other measures comprising the third category may be required as part of the companies' reclamation plans in those instances where the permitting State or Federal agencies have the authority to do so. Inclusion of these other possible measures in the environmental impact statement affords a practical means of utilizing the expertise of agency members to identify additional measures that, if implemented, would further reduce adverse impacts of the proposal. Inclusion of these other mitigating measures in this statement in no way obligates Kaiser Cement and Gypsum Corporation or restricts the decision-making prerogatives of the State regulatory agencies.

A. Laws and Regulations

1. General Statement

The proposed mining operation must comply with all applicable regulations of Federal, State, and County agencies including:

Mine Safety and Health Administration
Montana Department of State Lands
Montana Department of Health and Environmental Sciences
Jefferson County, Montana

Regulations enforced by the above agencies are variously designed to assure realization of the full and best interests of the public, to adequately protect the environment, and to achieve continuing highest productive use of the land consistent with surrounding land uses and management objectives.

2. State Laws

Significant State Laws for mitigating impacts include:

(a) Montana's Hard Rock Law defines reclamation requirements necessary for Departmental acceptance of the applicants reclamation plan, as well as other mitigating measures including accomplishment of specific activities, inspections of mining sites to determine compliance with the reclamation plan, performance bonds, and an annual report of activities by the permittee. In addition, all fees, fines, penalties,

and other uncleared moneys which have been or will be paid to the department of state lands under the provisions of this part shall be placed in the earmarked revenue fund in the state treasury and credited to a special account to be dsesignated as the hardrock mining and reclamation account. This account shall be available to the department by appropriation and shall be expended for the research, reclamation, and revegetation of land and the rehabilitation of water affected by any mining operations.

(b) Montana's Clean Air Act (Chapter 39 or Title 69, R.C.M. 1947) and administrative rules adopted thereunder (subchapter 1 of Chapter 14, Title 16, Montana Administrative Code) defines air pollution and provides that the Board of Health and Environmental Sciences may prohibit

> *the construction, installation, alteration, or use of any machine, equipment, device or facility which it finds may directly or indirectly cause or contribute to air pollution or which is intended primarily to prevent or control the emmission of air pollutants, unless a permit therefore has been obtained from it.*

(c) The State Antiquities Act, (Chapter 25 of Title 81, R.C.M. 1947) which is administered by the Board of Land Commissioners and the Montana Historical Society, provides for the registration and protection of historic, prehistoric, archeologic, paleontologic, scientific, or cultural sites and objects on State lands. It also provides that the Department is authorized to enter into cooperative agreements with private landowners to preserve, mark, maintain, excavate, or otherwise deal with such sites and objects upon such terms as may be agreed upon.

(d) The Montana Resource Indemnity Trust Act (Chapter 70 of Title 84, R.C.M. 1947, and rules adopted thereunder (subchapter 14 of Chapter 14, Title 42, Montana Administrative Code) provides for a tax on mineral production. The taxes are paid into the resource indemnity trust account. The trust account will be allowed to accumulate until it reaches the amount of one hundred million dollars, at which time the legislature is empowered to appropriate net earnings and all receipts for improvement of this environment and rectifying damages hereto.

3. Federal Laws

The mining companies must comply with standards and guidelines established by the Mine Safety and Health Administration to protect the health of employees involved in the mining process.

4. Jefferson County Laws

a. Property and Gross Proceeds Taxes

The facilities, including equipment and land of the proposed mining

project would be subject to a property tax levied by Jefferson County. The proceeds primarily would help fund the Montana City school district and Jefferson County. The gross proceeds tax is in effect a property tax on a mineral resource. It would be based on the dollar value of the ore extracted from the mine in any given year.

5. Local Ordinances

There are no significant local ordinances that would function to mitigate impacts from the proposed mining projects.

B. Reclamation Plans and Additional Mitigating Measures

The reclamation plans proposed by Kaiser Cement And Gypsum Corporation are presented in Chapter One. In addition, the following section contains those mitigating, compensating, or monitoring measures generally thought to have merit by the Department.

Among those measures considered as mitigation are those that involve the implementation of a different or varient plan of operations. Technologic alternatives and their possible application to the proposed mining project are contained in Chapter Four.

1. Topography

General mitigation of impacts to existing topography would include replacement of the mine waste dump material within the mined-out portion of the mine.

2. Air Quality

The operator should utilize, at a minimum, the following methods to control dust:

1) Reduce vehicle speeds,

2) load trucks in such a manner that ore would not be lost to create crushed ore dust on the road surface,
3) curtail the use of haul roads during unfavorable meteorological conditions if haul roads become significant sources of dust,
4) use of equipment present on the site to clear haul roads if dust producing material, such as spilled ore or overburden materials, presents a hazard to air quality, and
5) when the above control measures prove ineffective to suppress dust emissions from haul roads, the operator should sprinkle the haul road using a sprinkler truck with a 1,000 gallon tank.

3. Employee Health and Safety

Under provisions of the Federal Metal and Nonmetallic Mine Safety Act of 1966 (Public Law 89-577), MESA is responsible for the enforcement of the health and safety standards prescribed to protect the workers at all mine sites. With the signing of the Federal Mine Safety and Health Act of 1977 (Public Law 91-173), it became the responsibility of the Secretary of Health, Education, and Welfare and the Secretary of Labor to develop and promulgate improved health and safety standards for persons working at mining properties. New and/or revised regulations will be implemented by the Mining Safety and Health Administration (MSHA) under the Department of Labor.

4. Soils

a. Mine and Facility Sites

In all areas to be disturbed as a result of the proposed facilities, all suitable topsoiling materials should be salvaged and stockpiled.

Stripping of topsoil for stockpiling will require equipment operators to use caution and personal judgement to avoid salvage of extremely cobbly materials. All of the soils have variable amounts of coarse fragments occurring within short distances. Equipment operators should be made aware of this.

b. Roads

All roads will be constructed according to county standards with regard to side and back slopes which include sloping, grading and seeding. The potential for erosion and sedimentation can be further reduced by:

1) using existing access roads where possible,
2) designing new roads and upgrading existing roads to adequately accomodate the largest and heaviest piece of machinery involved in construction,
3) reducing road grades wherever possible,
4) installing cross-drainages in roads with erodible soils and steep grades,
5) providing a natural vegetation buffer between roads and streams,
6) restricting wet-weather road construction, particularly on poorly drained erodible soils,
7) avoiding roads in marshes, bogs, and other areas of extreme wetness.

5. Water Resources

Those mitigating measures identified previously in the Soils sections for reducing the potential of erosion and sedimentation apply to the mitigation of surface water impacts.

6. Flora

The following measures should be considered in addition to the reclamation requirements of the Montana Hard Rock Law and should provide mitigating measures enhancing revegetation success:

1) Species present in the proposed disturbed areas should be selected, when available, for use in reclamation. These species have demonstrated the capability to survive the climatic vicissitutes and site characteristics of the area.
2) Graded slopes should be kept as gentle as possible to enhance reclamation.

Mitigation of potential impacts to vegetation is linked closely with the successful mitigation of the impacts to the soils resource identified previously.

7. Terrestrial Fauna

A direct relationship exists between the amount of land disturbed as a result of development and the impacts of such disturbance upon wildlife. A concientious effort to disturb as little land as possible would have the most immediate and long-lasting mitigating effects.

In addition, Appendix C contains a letter from the Montana Fish and Game Department that suggests the following:

> *". . . some effort should be expended in developing a fish and wildlife compensation plan directed at enchancing wildlife values in the Helena area to compensate for those that are going to be inevitably lost during the mining process and perhaps after it as well."*

8. Social and Economic

a. Land Use

The responsibility for ascertaining the needed and desirable land use patterns for the Montana City area lies with the county government and local citizens. The communities are small enough that a town meeting approach to needs, desires and anticipated problems possibily caused by opening of the mine is still a viable approach. Leadership for continuing this process could be assured by either the Jefferson County Commission or by residents of the area.

b. Human Health and Safety

Those measures previously identified as reducing the amount of dust and other particulates associated with the project would likewise apply to reducing the risk of adverse affects upon the health of workers and

residents caused by these agents or their combination with other pollutants present in the air.

Because of the significant potential for conflict between ore haul trucks and residential traffic during peak road use hours, it is suggested that the ore truck traffic be restricted to those hours of the day when residential traffic is not heavy.

Because the proposed permit area encompasses a county road presently used by residents of the area, adequate posting of permit area to alert travelers to the mining operation and other measures necessary to protect the general public or other users of the road should be taken. The stationing of personnel along those sections of the road immediately adjacent the mine site to alert users of the road during blasting episodes would reduce the risk for possible blasting related conflicts with local traffic.

Care should be taken by ore truck drivers to avoid unnecessary damage to FAS #518 during adverse conditions such as spring breakup of the road surface.

c. Archeologic and Historic Sites

The Kaiser Cement and Gypsum Corporation have provided mitigation of the archeologic and historic resources of the permit area by conducting a preliminary survey and proposing a location of the mining facilities in an area not containing any identified sites.

Although valuable information regarding the area's prehistory could possibly be obtained by further evaluation of the identified sites, the proposed action of not disturbing the sites further is a valuable mitigating measure. Additional evaluation can be postponed until it is required, possibly at such a time that additional archeologic technology may enable a better understanding of the information gained.

The Montana Historic Preservation Office has made the following recommendation regarding potential future disturbance of identified sites related to mining activities (Appendix A): A

> *In the event that adverse impacts to the cultural resources cannot be avoided, the significance of each locality should be evaluated, and a mitigation plan to recover archeological and historical the most significant localities should be considered.*

d. Visual Resources

Those measures identified previously to reduce the dust associated with the mining activities would reduce the adverse visual impact related to increased dust levels. The major visual impact, creation of an open-pit mine and waste material stockpiles, could most effectively be mitigated

by placement of waste materials within the mine during reclamation, thereby reducing the pit size and eliminating the stockpiles. Recontouring of the pit following mining operations to more closely approximate adjacent topography would aid in reducing the visual intrusion of the open-pit upon the existing topography.

IV. ALTERNATIVES TO THE PROPOSED ACTION

A. Administrative Alternatives Available To State Agencies

1. Department of State Lands

a. Approval of the Operating Permit for the Life of the Operations

Section 82-4-337(2)(3) of the Hard Rock Law Provides that:

> *The operating permit shall be granted for the period required to mine the land covered by the plan and shall be valid until the surface or underground mining authorized by the permit is completed or abandoned unless the permit is suspended or revoked by the board* as provided in this part.*
>
> *The operating permit shall provide that the reclamation plan may be modified by the board*, upon proper application of the permittee or department, after timely notice and opportunity for hearing, at any time during the term of the permit and for any of the following reasons:*
>
> *(a) to modify the requirements so they will not conflict with existing laws;*
> *(b) when the previously adopted reclamation plan is impossible or impracticable to implement and maintain;*
> *(c) when significant environmental problem situations are revealed by field inspection.*

(1) Performance Bond

Section 82-4-338 of the Hard Rock Law provides that:

> *(1) The applicant shall file with the department a bond payable to the state of Montana with surety satisfactory to the department in the penal sum to be determined by the department of not less than $200 or more than $2,500 for each acre or fraction thereof of the disturbed area, conditioned upon the faithful performance of the requirements of this part and the rules of the board. In lieu of such bond, the applicant may file with the board a cash deposit, an assignment of a certificate of deposit, or other surety acceptable to the board*. Regardless of the above limits, the bond shall not be less than the estimated cost to the state to complete the reclamation of the disturbed land. A public or governmental agency shall not be required to post a bond under the provisions of this part. A blanket performance bond covering two or more operations may be accepted by the board*. Such blanket bond shall adequately secure the estimated*

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* Board of Land Commissioners, or such state employee or state agency as may succeed its powers and duties under this act.

total number of acres of disturbed land. When determined by the department that the set bonding level of a permit or license does not represent the present costs of reclamation, the department may modify the bonding requirements of that permit or license.

(2) No bond filed in accordance with the provisions of this part shall be released by the department until the provisions of this part, the rules adopted pursuant thereto, and this reclamation plan have been fulfilled.

(2) Suspension of Permit

Section 82-4-362 of the Hard Rock Law provides that:

(1) If any of the requirements of this part or the rules or the reclamation plan have not been complied with within the time limits set by the department or board or by this part, the department shall serve a notice of noncompliance on the licensee or permittee or, where found necessary, the commissioner shall order the suspension of the permit. The notice or order shall be handed to the licensee or permittee or, where found necessary, the commissioner shall order the suspension of the permit. The notice or order shall be handed to the licensee or permittee in person or served by certified or registered mail addressed to the permanent address shown on the application for a permit. The notice of noncompliance shall specify in what respects the operator has failed to comply with this part, the rules, or the reclamation plan.*

(2) If the licensee or permittee has not complied with the requirements set forth in the notice of noncompliance or order of suspension within the time limits set therein, the permit may be revoked by order of the board and the performance bond forfeited to the department.*

b. Denial of the Operating Permit

Section 82-4-351 of the Hard Rock Law provides that:

(1) A permit may be denied for any of the following reasons:
(a) the plan of development, mining, or reclamation conflicts with the state water and air purification standards;
(b) the reclamation plan does not provide an acceptable method for accomplishment of reclamation as required by this part.
(2) A denial of a permit shall be in writing and state the reasons therefor.

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* Board of Land Commissioners, or such state employee or state agency as may succeed its powers and duties under this act.

In addition, Section 82-4-352 provides that:

> *A permit may be denied and returned to the applicant with a request that the application be resubmitted with a different plan for reclamation. The person making application for a permit may then resubmit to the board* a new plan for reclamation.*

2. Department of Health and Environmental Sciences

a. Air Quality Bureau

(1) Approval of the Construction Permit

MAC 16-2.14(1)-S1400(3) of the departmental rules and regulations adopted pursuant to the Montana Clean Air Act (Title 75, Chapter 2, MCA) provides that:

> *The application for a permit shall be accompanied by plans, specifications, and such other information as the administrator deems necessary except that the administrator may dispense with the submission of plans and specifications upon prior written agreement.*

S1400(11) further states that:

> *Before any article, machine, equipment or other contrivance described in this regulation may be operated or used, a written permit shall be obtained from the administrator. No permit to operate or use shall be granted by the administrator for any article, machine, equipment or contrivance described in this regulation, constructed or installed without authorization as required in this regulation, until the information required pursuant to these regulations is presented to the administrator and such article, machine, equipment or contrivance is altered, if necessary, and made to conform to the standards set forth elsewhere in the standards and regulations formulated under authority of the Clean Air Act of Montana.*

(2) Denial of the Construction Permit

MAC 16-2.14(1)-S1400(12) provides that:

> *The administrator shall deny an authority to construct, or permit to operate or use, except as provided in this regulation, if the applicant does not show that every article, machine, equipment or other contrivance, the use of which may cause the issuance of contaminants, or the use of which may eliminate or reduce or control the issuance of air contaminants, is so designed, controlled, or equipped with such air pollution control equipment, that it may be expected to operate without emitting air contami-*

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* Board of Land Commissioners, or such state employee or state agency as may succeed its powers and duties under this act.

nants in violation of standards and regulations formulated under authority of the Clean Air Act of Montana.

In acting upon a permit to operate, if the administrator or a member of his staff finds that the article, machine, equipment or other contrivance has not been constructed in accordance with the authority to construct, he shall deny the permit to operate. The administrator shall not accept any further application for permit to operate the article, machine, equipment, or other contrivance so constructed until he finds that the article, machine, equipment or other contrivance has been constructed in accordance with the authority to construct.

(3) Conditional Approval of the Construction Permit

MAC 16-2.14(1)-S1400(13) provides that:

The administrator may issue an authority to construct or a permit to operate or use, subject to conditions which will bring the operation of any article, machine equipment or other contrivance within the standards of this regulation, in which case the conditions shall be specified in writing. Commencing work under such an authority to construct or operation under such a permit to operate shall be deemed acceptance of all the conditions so specified. The administrator shall issue an authority to construct or a permit to operate with revised conditions upon receipt of a new application, if the applicant demonstrates that the article, machine, equipment or other contrivance can operate within the standards of this regulation under the re-- vised conditions.

(4) Renewal of Construction Permit

MAC 16-2.14(1)-S1400(7) provides that:

(7) If the construction, installation or alteration for which a permit has been issued is not completed within two years from the date of issuance of the permit, a renewal of the permit shall be required.

B. Alternative Technology

1. Underground Mining

Underground mining using the room and pillar method of extraction would not be a viable alternative to open pit mining because of unfavorable costs. Mining will involve the extraction of large tonnages of low unit value limestone. Therefore, economic concerns dictate a high volume, low cost per ton mining method. Other concerns using underground techniques are as follows:

1) there is a potentially unstable roof condition because bedding planes dip at 35° to 55°;

2) 30 to 40% of the limestone reserve must remain in place as support pillars;

3) safety of personnel would become a major problem compared to surface mining.

2. Ship Ore from Other Sources

Limestone could be shipped into the Montana City Plant from other existing mines located elsewhere. The large tonnage of ore necessary, however, plus the high transportation cost do not make this alternative feasible.

3. Replacement of Mine Waste in Pit

Following completion of the mining project, stockpiles of waste rock resulting from creation of the mine pit could be removed from their position near the mine and returned to the mine pit. This would eliminate the piles and reduce the size of the mine pit, thus reducing the long-term visual impact of the mine. At the present time the cost of replacing the waste rock in the mine pit would limit the feasibility of doing so. At the termination of the operations, however (+78 years), it may be economically feasible to replace the waste.

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APPENDICES

Appendix A

MONTANA HISTORICAL SOCIETY
Founded 1865
Historic Preservation Office

225 N. ROBERTS PHONE (406) 449-2694 HELENA, MONTANA 59601

March 13, 1979

Ralph Drier
Environmental Administrator
Department of State Lands
Helena, MT 59601

RE: Kaiser Cement
mining permit, Jefferson Co.

Dear Ralph:

Please find below my comments regarding the identified cultural resources in the above project area.

A cultural resources reconaissance survey was conducted in the project area by Frederick Munday, a University of Montana archaeologist. Thirty-seven localities were identified, including 33 prehistoric occurrences, 2 historic homesteads, one potential historic burial, and one problematical archaeological feature.

Since the cultural resources identified have the potential to yield information important to history and prehistory, and since the information could be irretrievably lost as a result of mining activities, avoidance of the identified localities is recommended.

In the event that adverse impacts to the cultural resources can not be avoided, the significance of each locality should be evaluated, and a mitigation plan to recover archaeological and historical data from the most significant localities should be considered.

Sincerely,

Patti Bell

Patti Bell
State Archaeologist

Appendix B

KAISER CEMENT
& GYPSUM CORPORATION

MONTANA CITY, MONTANA 59602 • TELEPHONE 406/442-8855

December 18, 1978

Mr. Ralph E. Driear, Environmental Administrator
Department Of State Lands
Capitol Station
Helena, Montana 59601

Dear Ralph:

In regard to your letter dated December 11, 1978, the following clarifications are offered:

A) The attached calculations were made to roughly project operating life of the mine. Current projections indicate a 78 year life.

The pit could be expanded easily to a 318 year life, as is shown on Exhibit C of the application. Further expansion to the full dimension of the proposed permit bound is also possible, but the time frame involved removes the practical reference.

Assuming the demand for our product continues to grow, it is possible that the production capability of the Montana plant will be expanded to meet the market. Based on the production unit scale of this industry, a doubling or even tripling of the current capacity is reasonable.

B) Due to the longer haul between mine face and process, it is estimated that three or four additional employees would be required in the proposed operation.

Ralph, if we can be of further help in your work, please do not hesitate to call on us.

Sincerely,

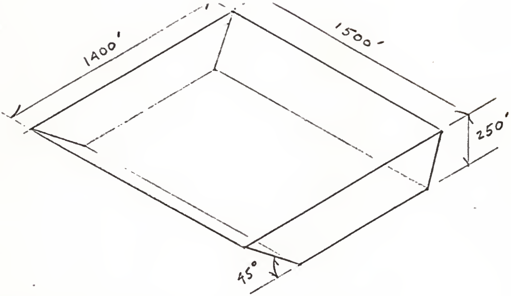
F. A. Nelson

F. A. Nelson
Plant Manager

cc: Jerry Burke

Approximate Reserve Calculation - Diehl Quarry

I. Current projection: 1400' wide
1500' long
250' deep



a) Volume = 250' x (1400'-250') x 1500' $\cong$ 4.3125 x 10^8 CF

b) Tonnage - assume 13 CF/ton in place

$\cong$ 33.2 MM Tons

c) Production Equivalent Cement @ $2650^{\#}$ stone/ton cement

$$\frac{\text{33.2 MM Tons Stone}}{2650/2000} \cong \text{25 MM Tons Product}$$

d) Years Life At Current Production Capacity

(25 MM Tons Production)/(.32 MM Tons Per Year) $\cong$ 78 Years

II. Expansion Of Mining Area

With some stripping along the hanging wall of the formation, the mine could be developed to full dimension of "TARGET MINERALS" shown on Exhibit C of the permit application (approximately 250' deep, 2000' wide & 4000' long).

a) Volume = 250' x (2000'-250') x 4000' $\cong$ 1.75 x 10^9 CF

b) Stone Reserve = 1.75 x 10^9CF/13 CF/T $\cong$ 1.34 x 10^8 Tons

c) Cement Production Available = 1.34 x 10^8 T/(2650 $^{\#}$/T/2000 $^{\#}$/T) $\cong$

1.02 x 10^8 TONS CEMENT

d) Years Life @ Current Capacity = 1.02 x 10^8/.32 x 10^6 $\cong$

318 YEARS

Nelson 12-18-78

STATE OF MONTANA

DEPARTMENT OF
FISH AND GAME

Appendix C

Helena, MT 59601
December 22, 1978

Mr. Rick Nelson, Plant Manager
Kaiser Cement & Gypsum Corporation
Montana City, MT 59602

Dear Mr. Nelson:

As requested earlier, I have inspected the site in the NW½ Section 15, S½ Section 10 plus the NE¼SE¼ Section 9 and Lot 12 of Section 9 that you outlined for me on the East Helena, Montana quadrangle - all of this property lying within T9N, R3W.

I also have reviewed a wildlife report that was prepared by Karen Zackheim for the Diehl Company that encompasses the area in question.

Consistent with that report, I found the area to possess significant wildlife values. My inspection trip, made on the 21st of December, also revealed that in spite of the heavy snowcover present in the area this winter, the ridge tops and south-facing slopes are blown bare by the wind and exhibiting wildlife use. I noted in the Diehl report that urbanization extending throughout the area would eventually displace the major wildlife species, particularly game animals. While I concur with this finding, I do not think it should be accepted as inevitable, and care should be taken in planning the reclamation and mining process so that wildlife values can be ultimately restored.

At the present time the site is being used by wildlife - evidence of wintering mule deer is present as well as evidence of many other wildlife species utilizing the bare slopes during the winter season. This use still persists in spite of the fact that some encroachment in the form of residential property already is occurring.

In conclusion, I believe that every effort should be made to retain wildlife values in the reclamation process, and some effort should be expended in developing a fish and wildlife compensation plan directed at enhancing wildlife values in the Helena area to compensate for those that are going to be inevitably lost during the mining process and perhaps after it as well.

On the subject of endangered species, there is no evidence that rare, endangered or threatened species are dependent upon this particular area.

Sincerely,

James A. Posewitz, Administrator
Ecological Services Division

JAP/sd

cc: Ralph Driear
LeRoy Ellig

Appendix D

IN REPLY REFER TO

United States Department of the Interior

BUREAU OF LAND MANAGEMENT
District Office
Box 308
Butte, Montana 59701

March 13, 1979

Mr. Ralph E. Driear
Environmental Administrator
Department of State Lands
Capital Station
Helena, Montana 59601

Dear Mr. Driear:

The mining of limestone on unpatented land is allowed under the 1872 mining law and does not involve a BLM management decision. As a result, the BLM is not involved in a Section 106 of the National Historic Preservation Act compliance procedure. If cultural resources had been located on the unpatented land, they may have been protected by the 1906 Antiquities Act or the Federal Land Policy and Management Act.

If the BLM or any Federal agency was involved in the licensing or financing of this action, Dr. Munday's report would not be adequate since an evaluation of significance is needed for a Section 106 compliance.

In the margin of Page 17 of Dr. Munday's report, someone has asked a question about one of the reported rock features. The feature is not a Section ¼ corner. The ¼ corner in that location is an iron post.

Sincerely yours,

Jack A. McIntosh, District Manager

Acting

CONSERVE
AMERICA'S
ENERGY

Save Energy and You Serve America!